

ABSTRACT OF THE DISCLOSURE

A programmable amplifier 100 operable to independently adjust the amplification given to various optical signals passing through an optical fiber. An input optical fiber 102 provides a number of optical signals to a demultiplexer which separates each signal carried by the input fiber 102. Each individual wavelength travels to a variable attenuator 106 which lowers the signal strength of each signal based on an input from the system controller 108. The attenuated signals are combined by multiplexer 112 and input to an optical amplifier 114. The optical amplifier 114 receives the combined signal and amplifies each signal in the combined DWDM signal across the entire bandwidth of the amplifier 114. The amplified signals are input to a splitter 116 which removes a small portion of the entire spectrum output by the amplifier 114. The remaining portion of the signal passes to an output fiber 110 and travels to the remainder of the optical network. The small portion of the signal separated by the splitter 116 is input to a spectrum analyzer 118 which detects the signal strength of each component signal traveling through the optical amplifier 100. Signal strength information is passed to the system controller 108. The system controller 108, typically a digital signal processor or programmable microcontroller, uses the information from the spectrum analyzer 118 to control the variable attenuators and the gain of amplifier 114 in order to level the various signals traveling through the amplifier 100.